

## **REMARKS**

Claims 1, 5 and 7 are all the claims pending in the application.

### **I. Claim Rejections under 35 U.S.C. § 112, first paragraph**

Claims 1, 5 and 7 have been rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the written description requirement. In particular, regarding the claimed “ratio” being greater than or equal to 0.3 and less than 0.6, the Examiner has indicated that the specification does not provide support for an end point of 0.6 (see Office Action at page 2).

By this amendment, Applicants note that claims 1, 5 and 7 have been amended so as to recite that ratio is in a range from 0.3 to 0.58. Regarding a ratio of 0.58, Applicants note that Examples 1 and 4 (i.e., Ex.1 and Ex.4) as shown in Table 1 on page 16 of the specification provide support for such a ratio.

In view of the foregoing, Applicants kindly request that the Examiner reconsider and withdraw the above-noted rejection under 35 U.S.C. 112, first paragraph.

### **II. Claim Rejections under 35 U.S.C. § 103(a)**

A. Claims 1, 5 and 7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 2000-326430 (hereafter “the JP ‘430 reference”).

Regarding claim 1, Applicants note that this claim has been amended herein to recite that a ratio between a total area of lower base portions of said hollow protrusions and an area of liner portions of the thermoplastic resin sheets is in a range from 0.3 to 0.58, wherein the lower base portions of said hollow protrusions are open portions of said hollow protrusions which are

opposite to the end faces of the hollow protrusions, and the liner portions of the thermoplastic resin sheets are portions of the thermoplastic resin sheets in which the hollow protrusions are not formed, and wherein a rising angle of a side face of each of said hollow protrusions in a vertical plane including a central axis of the hollow protrusion is in a range from 50 degrees to 70 degrees.

With respect to the above-noted features, Applicants note that in the Office Action, the Examiner has recognized that the JP '430 reference is silent regarding such features. The Examiner, however, has taken the position that it would have been obvious "to form the truncated cones of whatever size and/or spacing is required for a particular application and since this would merely involve a change in shape and/or size which is generally within ordinary skill in the art." Applicants respectfully disagree with the Examiner's position.

In particular, Applicants respectfully that such a position is simply a blanket statement that it would have been obvious to modify the hollow plate structure of the '430 reference so as to have any possible configuration, or in other words, that it would have been an obvious matter of design choice to modify the hollow plate structure in any possible manner. Applicants respectfully disagree, and submit that the specific configuration defined by the features set forth in claim 1 would not have been a matter of mere design choice.

For example, with respect to the above-noted features recited in claim 1 drawn to the configuration of the hollow structure plate, Applicants note that the specification clearly explains that by providing such a configuration, it is possible to obtain a hollow structure plate having good bending characteristics (e.g., see Table 1 on page 16 of the specification, and the disclosure on page 16 of the specification at lines 9-17). For example, as is evident from Table 1, the

bending elasticity gradient of Example 5 (i.e., Ex.5), where the “ratio” is greater than 0.6, is only 410 N/cm, whereas the bending elasticity of Examples 1-4 (i.e., Ex.1 - Ex.4), where the “ratio” is less than or equal to 0.58, is greater than 420 N/cm.

Additionally, when comparing Example 2 (i.e., Ex.2) and Comparative Example 4 (i.e., Com.Ex.4) as shown in Table 1, where the “ratio” is the same value (i.e., 0.51), webbing occurred and a satisfactory hollow structure plate was not obtained in Comparative Example 4, where the “angle” was not within “50 to 70 degrees”. In contrast, in Example 2 (i.e., Ex.2), where the “angle” is within “50 to 70 degrees”, the bending elasticity gradient of 500 N/cm is obtained.

In view of the foregoing technical advantages that are provided by utilizing the above-noted combination of features recited in claim 1, Applicants respectfully submit that the features recited in claim 1 would not be a matter of mere design choice to one of ordinary skill in the art.

In this regard, Applicants note that the Federal Circuit has held that a claimed invention should not be rejected as a mere "design choice" when the Applicant presents evidence of the technical advantages of the Applicant's structure. *See In re Chu*, 66 F.3d 292, 36 USPQ2d 1089 (Fed. Cir. 1995). Here, as described above, Applicant's disclosure identifies the operational benefits obtained by utilizing a hollow structure plate having the above-noted configuration (e.g., see Table 1 on page 16 of the specification, and the disclosure on page 16 of the specification at lines 9-17).

Therefore, because the features recited in claim 1 confer technical advantages over the prior art, Applicants respectfully submit that such features would not have been a simple matter of design choice.

Further, with respect to the Examiner's position that a "change in shape and/or size" is generally within the skill level of one of ordinary skill in the art, Applicants respectfully submit that such a change in shape and/or size would not be obvious if the claimed dimensions provide technical advantages over the prior art. For example, as explained in MPEP 2144.04(IV)(A), where the "only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device" (emphasis added).

Taking the foregoing into account, Applicants note that while a claimed device having dimensions different than the prior art device may be obvious if the claimed device would not perform differently than the prior art device, in the present situation, because the claimed "ratio" and "angle" as set forth in claim 1 causes the claimed device to perform differently than the prior art device by achieving superior bending characteristics as compared to the prior art device, Applicants submit that it would not have been obvious to one of ordinary skill in the art to modify the prior art device so as to have the above-noted features recited in claim 1.

In view of the foregoing, Applicants respectfully submit that the JP '430 reference does not render obvious the above-noted features recited in amended claim 1 which set forth that a ratio between a total area of lower base portions of said hollow protrusions and an area of liner portions of the thermoplastic resin sheets is in a range from 0.3 to 0.58, wherein the lower base portions of said hollow protrusions are open portions of said hollow protrusions which are opposite to the end faces of the hollow protrusions, and the liner portions of the thermoplastic resin sheets are portions of the thermoplastic resin sheets in which the hollow protrusions are not

formed, and wherein a rising angle of a side face of each of said hollow protrusions in a vertical plane including a central axis of the hollow protrusion is in a range from 50 degrees to 70 degrees.

Accordingly, Applicants submit that claim 1 is patentable over the cited prior art, an indication of which is kindly requested.

Regarding claims 5 and 7, Applicants note that these claims have been amended herein to recite that a ratio between a total area of lower base portions of the pins and a surface area of said emboss rollers on which the pins are not formed, is in a range from 0.3 to 0.58; and that a rising angle of a side face of each of the pins in a vertical plane including a central axis of the pin is in a range from 50 degrees to 70 degrees.

For at least similar reasons as discussed above, Applicants respectfully submit that the JP '430 reference does not disclose, suggest or otherwise render obvious the above-noted features recited in claims 5 and 7. Accordingly, Applicants submit that claims 5 and 7 are patentable over the cited prior art, an indication of which is kindly requested.

In addition, regarding claim 5, Applicants note that this claim recites the features of introducing, using a pair of sheet-introduction plates, two thermoplastic resin sheets into a pressure-reduced chamber; and thermally fusing, using a heater that is disposed between the pair of sheet-introduction plates, the end faces of said hollow protrusions in a position of a contact point of the emboss rollers continuously; wherein the pair of sheet-introduction plates are inclined in a direction toward the contact point.

Regarding the above-noted features in claim 5, Applicants respectfully submit that the JP '430 reference does not disclose or suggest such features, and therefore, that claim 5 is

patentable over the cited prior art. In this regard, with respect to such features, Applicants note that the Examiner has not addressed these features in the Office Action. Accordingly, if the Examiner maintains the rejection of claim 5, Applicants request that the Examiner explicitly identify the elements in the JP ‘430 reference that are being relied upon as corresponding to the claimed “sheet-introduction plates” and the claimed “heater” so that Applicants are able to make an informed decision with regard to appeal.

Further, regarding claim 7, Applicants note that this claim recites the features of a pair of sheet-introduction plates for introducing the two thermoplastic resin sheets into the pressure-reduced chamber, the pair of sheet-introduction plates being inclined in a direction toward the contact point; and a heater for heating that is arranged at said front opening portion of said pressure-reduced chamber between the pair of sheet-introduction plates.

Similar to the discussion above regarding claim 5, Applicants respectfully submit that the JP ‘430 reference does not disclose or suggest such features, and therefore, that claim 7 is patentable over the cited prior art. In this regard, with respect to such features, Applicants note that the Examiner has not addressed these features in the Office Action. Accordingly, if the Examiner maintains the rejection of claim 7, Applicants request that the Examiner explicitly identify the elements in the JP ‘430 reference that are being relied upon as corresponding to the claimed “sheet-introduction plates” and the claimed “heater” so that Applicants are able to make an informed decision with regard to appeal.

B. Claim 1 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over any of Clark (US 6,004,652), Shorten et al. (US 6,029,962) or Sell et al. (US 6,385,864).

Regarding claim 1, as noted above, this claim has been amended to recite that a ratio between a total area of lower base portions of said hollow protrusions and an area of liner portions of the thermoplastic resin sheets is in a range from 0.3 to 0.58, wherein the lower base portions of said hollow protrusions are open portions of said hollow protrusions which are opposite to the end faces of the hollow protrusions, and the liner portions of the thermoplastic resin sheets are portions of the thermoplastic resin sheets in which the hollow protrusions are not formed, and wherein a rising angle of a side face of each of said hollow protrusions in a vertical plane including a central axis of the hollow protrusion is in a range from 50 degrees to 70 degrees.

Applicants respectfully submit that neither Clark, nor Shorten, nor Sell renders obvious the above-noted combination of features recited in claim 1.

In this regard, with respect to each of the above-noted references, the Examiner has recognized in the Office Action that such references do not disclose the above-noted features recited in claim 1. The Examiner, however, has taken the position that based on the disclosure in the above-noted references that the structures can be provided with varying shapes and sizes, that it would have been obvious to modify such references so as to have the particular configuration defined in claim 1. Applicants respectfully disagree.

In particular, Applicants respectfully submit that such a position is simply a blanket statement that it would have been obvious to modify the structures disclosed in the above-noted references so as to have any possible configuration, or in other words, that it would have been an obvious matter of design choice to modify such structures in any possible manner. Applicants respectfully disagree with such a position, and submit that the specific configuration defined by

the features set forth in claim 1 would not have been a matter of mere design choice.

For example, as described above, with respect to the above-noted features recited in claim 1 drawn to the configuration of the hollow structure plate, Applicants note that the specification clearly explains that by providing such a configuration, it is possible to obtain a hollow structure plate having good bending characteristics (e.g., see Table 1 on page 16 of the specification, and the disclosure on page 16 of the specification at lines 9-17). For example, as is evident from Table 1, the bending elasticity gradient of Example 5 (i.e., Ex.5), where the “ratio” is greater than 0.6, is only 410 N/cm, whereas the bending elasticity of Examples 1-4 (i.e., Ex.1 - Ex.4), where the “ratio” is less than or equal to 0.58, is greater than 420 N/cm.

Additionally, when comparing Example 2 (i.e., Ex.2) and Comparative Example 4 (i.e., Com.Ex.4) as shown in Table 1, where the “ratio” is the same value (i.e., 0.51), webbing occurred and a satisfactory hollow structure plate was not obtained in Comparative Example 4, where the “angle” was not within “50 to 70 degrees”. In contrast, in Example 2 (i.e., Ex.2), where the “angle” is within “50 to 70 degrees”, the bending elasticity gradient of 500 N/cm is obtained.

In view of the foregoing technical advantages that are provided by utilizing the above-noted combination of features recited in claim 1, Applicants respectfully submit that the features recited in claim 1 would not be a matter of mere design choice to one of ordinary skill in the art.

In this regard, Applicants note that the Federal Circuit has held that a claimed invention should not be rejected as a mere "design choice" when the Applicant presents evidence of the technical advantages of the Applicant's structure. *See In re Chu*, 66 F.3d 292, 36 USPQ2d 1089 (Fed. Cir. 1995). Here, as described above, Applicant's disclosure identifies the operational



benefits obtained by utilizing a hollow structure plate having the above-noted configuration (e.g., see Table 1 on page 16 of the specification, and the disclosure on page 16 of the specification at lines 9-17).

Therefore, because the features recited in claim 1 confer technical advantages over the prior art, Applicants respectfully submit that such features would not have been a simple matter of design choice.

Further, with respect to the Examiner's position that a "change in shape and/or size" is generally within the skill level of one of ordinary skill in the art, Applicants respectfully submit that such a change in shape and/or size would not be obvious if the claimed dimensions provide technical advantages over the prior art. For example, as explained in MPEP 2144.04(IV)(A), where the "only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device" (emphasis added).

Taking the foregoing into account, Applicants note that while a claimed device having dimensions different than the prior art device may be obvious if the claimed device would not perform differently than the prior art device, in the present situation, because the claimed "ratio" and "angle" as set forth in claim 1 causes the claimed device to perform differently than the prior art device by achieving superior bending characteristics as compared to the prior art device, Applicants submit that it would not have been obvious to one of ordinary skill in the art to modify the prior art device so as to have the above-noted features recited in claim 1.

In view of the foregoing, Applicants respectfully submit that the above-noted references

do not render obvious the features recited in amended claim 1 which set forth that a ratio between a total area of lower base portions of said hollow protrusions and an area of liner portions of the thermoplastic resin sheets is in a range from 0.3 to 0.58, wherein the lower base portions of said hollow protrusions are open portions of said hollow protrusions which are opposite to the end faces of the hollow protrusions, and the liner portions of the thermoplastic resin sheets are portions of the thermoplastic resin sheets in which the hollow protrusions are not formed, and wherein a rising angle of a side face of each of said hollow protrusions in a vertical plane including a central axis of the hollow protrusion is in a range from 50 degrees to 70 degrees.

Accordingly, Applicants submit that claim 1 is patentable over the cited prior art, an indication of which is kindly requested.

### **III. Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited.

If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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